49. (New) The system of claim 19, wherein the means for compressing comprises means for performing lossless compression.

50. (New) The method of claim 30, wherein the step of compressing comprises the step of performing lossless compression.

*   *   *   *

REMARKS

Claims 1-11 and 19-40 are pending in the application and have been rejected. Claims 1, 2, 4, 6, 7, 8, 10, 19-22, 30, 31, 33, 35, 36, 37, and 39 have been amended. A marked up version illustrating the claim amendments is annexed hereto. New claims 48, 49 and 50 have been added, but not new matter has been introduced by virtue thereof. The Examiner's reconsideration of the claim rejections is respectfully requested in view of the above amendments and following remarks.

Claims 1-11 and 19-40 were rejected under 35 U.S.C. 103(a) and being unpatentable over U.S. Patent No. 6,026,217 to Adiletta for the reasons set forth on page 2 of the Office Action.

In general, claims 1, 19 and 30 are directed to systems and method for providing "accelerated" data storage and retrieval. Accelerated data storage according to the claimed invention comprises receiving a digital data stream at a data transmission rate which is greater than the data storage rate of a target storage device, compressing the input stream at a compression rate that increases the effective data storage rate of the target storage device and storing the compressed data in the target storage device.

Advantageously, the inventions of claims 1, 19 and 30 provide systems and methods for effectively increasing the data storage rate of a memory storage device. By way of example,

assume that a mass storage device (such as a hard disk) has a data storage rate of 20 megabytes per second. If a data accelerator (e.g., storage controller) for the mass storage device is capable of compressing (in real time) an input data stream with an average compression rate of 3:1, then data can be stored in the mass storage device at a rate of 60 megabytes per second, thereby effectively increasing the storage bandwidth (storage rate) of the mass storage device by a factor of three (as well as obtaining a 3 fold increase in the storage capacity of the storage device).

Further, claims 6, 21 and 35 further provide means for "accelerated" data retrieval comprising retrieving a compressed digital data stream from a target storage device at the rate equal to the data access rate of the target storage device and then decompressing the compressed data at a rate that increases the effective data access rate of the target storage device. By way of example, if a target data storage device is capable of continuously supplying 20 megabytes per second and a data retrieval accelerator is capable of providing an average decompression ratio of 1:3, then a 60 megabytes per second output data stream is achieved, thereby effectively increasing the data access rate of the data storage device.

Advantageously, providing "accelerated" data storage and retrieval at (or close to) real-time can reduce or eliminate traditional bottlenecks associated with, e.g., local and network disk accesses. Indeed, by way of example, the user of a PC (personal computer) comprising a data storage controller having means for "accelerated" data storage and retrieval (as claimed herein) would perceive a significant decrease in the time to store/save and retrieve files, applications, etc., from the hard disk, in contrast to the same PC having a data storage controller using conventional protocols for data storage/retrieval.

To establish a prima facie case of obviousness, at the very least, Adiletta must teach or suggest all the claim elements. Here, at the very minimum, it is respectfully submitted that

Adiletta is legally deficient to establish a prima facie case of obviousness against claims 1, 19 and 30 because at the very least, <u>Adiletta does not teach or suggest a method for increasing the effective storage rate of a target storage device to enable accelerated data storage</u>.

Although Adiletta arguably discloses compressing data prior to storing the data to thereby achieve a reduction in the required storage space, Applicant respectfully submits that such teaching <u>does not suggest a method for providing accelerated data storage comprising compressing and storing data in such a manner as to increase the effective data storage rate of a target storage device</u>, as essentially claimed in claims 1, 19 and 30.

Indeed, notwithstanding that a storage control system can use data compression to compress data prior to storage so as to provide a decrease in the needed memory storage, the compression process may provide a significant latency such that there is <u>no</u> effective increase in the data storage rate. In particular, the latency from the compression process may be such that the time needed to simply store the uncompressed data is less than or equal to the time needed to compress the data and store the compressed data. Therefore, although decrease storage space may be realized, an increase in the rate of data storage of the compressed data would not be realized.

Here, Adiletta discloses a purportedly fast and efficient data compression scheme. Adiletta teaches that the only time during which the entire, compressed video image is stored in memory is following the encoding process (see, Adiletta, Col. 38, line 66 – Col. 39, line 3). In other words, Adiletta discloses a compression method that stores the compressed data in memory <u>only after</u> the compression process is complete. However, if the time that is required for the compression process and the subsequent storage process is greater than or equal to the time to

7

store uncompressed data, the Adiletta system may realize a decrease in storage, but such system will not realize "accelerated data storage" as contemplated by the present invention.

It is respectfully submitted that there is no objective teaching in Adiletta that would suggest to one of ordinary skill the art a mechanism for providing "accelerated" data storage in accordance with the invention. To conclude otherwise would be nothing more than impermissible hindsight reasoning based on Applicant's disclosure. Therefore, for at least the above reasons, claims 1, 19 and 30 are believed to be non-obvious and patentable over Adiletta.

Claims 2-11 depend from claim 1, claims 20-29 depend from claim 19 and claims 31-39 depend from claim 30. As such, these claims are believed to be non-obvious and patentable over Adiletta at least for the reasons given above for respective base claims 1, 19 and 30.

Furthermore, notwithstanding that claims 2-11, 20-29 and 31-39 have been summarily rejected without providing arguments establishing a prima facie case of obviousness as required (see, MPEP 2142), these claims are believed to be patentable in their own right.

For instance, it is respectfully submitted that Adiletta does not disclose or suggest the inventions of claims 2, 20 and 31, which recite wherein the compression rate is at least equal to the ratio of the input data transmission rate to the data storage rate so as to provide <u>continuous storage of the input data stream at the input data transmission rate.</u> In fact, Adiletta <u>teaches away</u> from continuous storage of the input data stream at the input data transmission rate. In particular, as noted above, Adiletta teaches that the only time during which the entire, compressed video image is stored in memory is following the encoding process (see, Adiletta, Col. 38, line 66 – Col. 39, line3). In other words, Adiletta discloses a compression method that stores the compressed data in memory <u>only after</u> the compression process is complete. Therefore, Adiletta does not teach or suggest continuous storage of the input stream during the compression process,

8

as essentially claimed. In short, Adiletta simply does not teach or suggest the claimed process of increasing the effective storage rate of a target storage device, much less providing continuous storage of the input data stream at the input data transmission rate.

Furthermore, with respect to claims 6, 21 and 35, Applicant finds nothing in Adiletta that objectively teaches or suggests (nor is it even contended in the Office Action) a system or method for providing accelerated data retrieval comprising retrieving the compressed data stream from the target storage device at a rate equal to a data access rate of the target storage device, and decompressing the compressed data at a decompression rate that increases the effective data access rate of the target storage device.

Accordingly, for at least all of the above reasons, the withdrawal of the rejections of claims 1-11 and 19-40 under §103 is respectfully requested.

New claims 48-50 are directed to methods and systems for providing accelerated data storage using lossless compression. These claims are believed to be patentable over Adiletta for at least the reasons given above for respective base claims 1, 19 and 30 and further because Adiletta discloses a video data compression protocol that provides lossy data compression.

Early and favorable consideration of this application is earnestly solicited.

Respectfully submitted,

Frank V. DeRosa
Reg. No. 43,584
Attorney for Applicant(s)

F. Chau & Associates, LLP
1900 Hempstead Turnpike
Suite 501
East Meadow, NY 11554
TEL.: (516) 357-0091
FAX: (516) 357-0092

Marked-Up Version Illustrating Claim Amendments

1. (Amended) A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for providing accelerated data storage and retrieval, said method steps comprising:

receiving a data stream at an input data transmission rate which is greater than a data storage rate of a target storage device;

compressing the data stream at a compression rate that increases the effective data storage rate of the data storage device [ratio which provides a data compression rate that is greater than the data storage rate]; and

storing the compressed data stream in the target storage device.

2. (Amended) The program storage device of claim 1, wherein the compression [ratio] rate is at least equal to the ratio of the input data transmission rate to the data storage rate so as to provide continuous storage of the input data stream at the input data transmission rate.

4. (Amended) The program storage device of claim 3, wherein the instructions for performing the adjusting step include instructions for performing one of adjusting the input data transmission rate, adjusting the compression rate [ratio] and a combination thereof.

6. (Amended) The program storage device of claim 1, further including instructions for performing the steps of:

retrieving the compressed data stream from the target storage device at a rate equal to a data access rate of the target storage device; and

decompressing the compressed data at a decompression rate that increases the effective [ratio to provide an output data stream having an output transmission rate which is greater than the] data access rate of the target storage device.

7. (Amended) The program storage device of claim 6, wherein the decompression rate [ratio] is equal to the ratio of the data access rate to the input data transmission rate so as to obtain an output data transmission rate which is equal to the input data transmission rate.

10

8. (Amended) The program storage device of claim 6, wherein the decompression rate [ratio] is equal to or greater than the ratio of the data access rate to a maximum accepted output data transmission.

10. (Amended) The program storage device of claim 9, wherein the instructions for performing the adjusting step include instructions for performing one of adjusting the data retrieval rate, adjusting the decompression rate [ratio], and a combination thereof.

19. (Amended) A system for accelerating the rate of data storage and retrieval of a data storage device, comprising:

means for receiving a data stream having an input data transmission rate which is greater than a data storage rate of the data storage device; [and]

means for compressing the data stream at a compression rate that increases the effective data storage rate of the data storage device [ratio which provides a data compression rate that is greater than the data storage rate]; and

means for storing the compressed data stream in the data storage device.

20. (Amended) The system of claim 19, wherein the compression rate [ratio] is at least equal to the ratio of the input data transmission rate to the data storage rate so as to provide continuous storage of the input data stream at the input data transmission rate.

21. (Amended) The system of claim 19, further comprising:

means for receiving the compressed data stream from the storage device at a rate equal to a data access rate of the storage device; and

means for decompressing the compressed data at a decompression rate that increases the effective [ratio that provides an output data stream having an output transmission rate which is greater than the] data access rate of the storage device.

22. (Amended) The system of claim 21, wherein the decompression rate [ratio] is equal to the ratio of the data access rate to the input data transmission rate so as to obtain an output data transmission rate which is equal to the input data transmission rate.

30. (Amended) A method for providing accelerated data storage and retrieval, comprising the steps of:

receiving a data stream at an input data transmission rate which is greater than a data storage rate of a target storage device;

compressing the data stream at a compression rate that increases the effective data storage rate of the data storage device [ratio which provides a data compression rate that is greater than the data storage rate]; and

storing the compressed data stream in the target storage device.

31. (Amended) The method of claim 30, wherein the compression rate [ratio] is at least equal to the ratio of the input data transmission rate to the data storage rate so as to provide continuous storage of the input data stream at the input data transmission rate.

33. (Amended) The method of claim 32, wherein the adjusting step includes one of adjusting the input data transmission rate, adjusting the compression rate [ratio], and a combination thereof.

35. (Amended) The method of claim 30, further including the steps of:

retrieving the compressed data stream from the target storage device at a rate equal to a data access rate of the target storage device; and

decompressing the compressed data at a decompression rate that increases the effective [ratio to provide an output data stream having an output transmission rate which is greater than the] data access rate of the target storage device.

36. (Amended) The method of claim 35, wherein the decompression rate [ratio] is equal to the ratio of the data access rate to the input data transmission rate so as to obtain an output data transmission rate which is equal to the input data transmission rate.

37. (Amended) The method of claim 35, wherein the decompression rate [ratio] is equal to or greater than the ratio of the data access rate to a maximum accepted output data transmission rate so as to provide a continuous and optimal data output transmission rate.

39. (Amended) The method of claim 38, wherein the adjusting step includes one of adjusting the data retrieval rate, adjusting the decompression rate [ratio], and a combination thereof.